

Section VII, Chapter I

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DISEASES OF THE NERVOUS SYSTEM

might be assumed to be the greatest. It is quite evident that the instability depends not upon the normal insufficiency of cerebral development, but upon the acquisition of tetany, which causes cerebral instability.

It has long been held that convulsions were caused by materials absorbed from the gastro-intestinal tract. It is certainly true that over-feeding or indigestion may excite convulsions. This is usually, however, in children suffering from tetany and it is very likely that the convulsions frequently are not due to any specificity of the material absorbed, but that any irritation to the child's nervous system is likely to be followed by convulsions. Convulsions are sometimes seen, it must be admitted, in infants when no evidence of organic disease can be detected, nor any symptoms of tetany and no hyperexcitability of the nervous system as shown by electrical examination. The cause of these is not clear.

Convulsions are apparently at times of toxic origin. They may result from conditions like uremia and asphyxia and also at the onset or in the course of various infectious diseases. They are more frequent in children who have or have had tetany, but may be found without any evidences of this. They are very frequent at the onset of certain diseases, particularly pneumonia, scarlet fever, malaria and severe intestinal disease. In pertussis, which, of all the infectious diseases, is the one in which convulsions are most frequent, several factors may be present: asphyxia, due to a severe paroxysm, cerebral congestion or hemorrhage resulting from such a paroxysm, or simply a peculiar susceptibility of the patient brought about by the disease itself. One attack of convulsions, whatever the cause, renders the patient more liable to a second attack and when there have been several, they occur from causes which are less and less marked.

An infrequent cause of convulsions in young children is an encephalopathy due to lead poisoning. We have seen eight such cases, six of which were fatal. The poisoning was caused in each instance by the child's nibbling and swallowing the paint from his crib or furniture.

Convulsions ending fatally are not infrequently associated with enlargement of the thymus gland. We have seen many such where there was found at autopsy great enlargement of the thymus and the lymphatic structures. Some of these infants were previously healthy; some were rachitic. The similarity of all these cases indicated that the convulsions were in some way associated with the enlarged thymus, but the exact explanation of such cases is not understood. In infants who die during convulsions the brain may be the seat of punctate hemorrhages, and sometimes of more extensive ones. The lungs are also deeply congested, and the right heart is generally distended with dark clots. The other lesions found are accidental.

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Symptoms.—In extreme restlessness, face, hands, feet, or quite suddenly with that the face is pale, a moment or two, eye or face, or in or until all parts of the become general, but a local cause—a point the facial muscles back; the hands are quick spasmodic convulsions some frothing at the consciousness. The pulse is weak; the forehead is covered and becomes slightly blue sounds may be produced evacuated. The convulsions and extension occur; spasm may be seen, the two sides of the body from a few moments usually become less frequent the patient in a condition or there may be but follows the convulsions dences of prostration tion of the nerve center.

Death may take rare except in very young may be no sequel to they may produce a hemorrhage; in such hemorrhage is the cause convulsions is generally rapidly recurring attacks several minutes have

One attack of convulsions by several others, especially if the child has

Holt, L. Emmett and John Howland, *The Diseases of Infancy and Childhood*, Appleton and Co., New York and London, 1923

r four or five days, or
out perhaps being suf-
unmistakable evidence
es are often ascribed to

ptom is persistent and
ack of general convul-
a period of irritative
re is headache, usually
photophobia; sometimes
ng out at night, which
; sometimes during the
ese frequent screaming
hyperesthetic; the re-
the neck may be rigid
dity of the extremities.
y be nystagmus. The
if disturbed. In some
suggest meningococcus
f marked apathy and
miting, and the bowels
somewhat accelerated,

The respiration is of
g sleep or perfect quiet
very significant. The
° to 100.5° F. When
tuberculosis elsewhere

is subside, and the stu-
rbed, the child may
ed, and then appears
und that the child can
: pupils respond slowly
asionally there is seen
e often there is hemi-
ses are often transient,
ments of the extremi-
sular twitchings may
constant. In infants
ren especially, the ab-
" After drawing the
appears a distinct red
is the *tâche cérébrale*,

Section VII, Chapter III

TUBERCULOUS MENINGITIS

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and it is almost always present. Other vasomotor disturbances may be seen. The reflexes are variable; in the early part of the disease they are usually increased, later they are diminished or abolished. The pulse now becomes slow and irregular, often intermittent. The respiration is almost always irregular; a very characteristic type consists in the movements becoming deeper and deeper until there is a sigh; followed by a complete arrest of respiration for several seconds. The phenomenon is then repeated. An examination with the ophthalmoscope usually shows the presence of choked discs, and in a very considerable number of the cases, if they are closely studied, tubercles may be seen in the choroid. Their presence is of much diagnostic importance. The blood picture in this disease is fairly characteristic. From 230 observations made in our hospital service, it was shown that early in the attack the total leucocytes are only slightly increased, they may be even below the normal. As the disease progresses they increase in number, the average during the last week of the disease being 29,600. The proportion of polymorphonuclears also shows a marked increase. The early range was 60 to 65 per cent; during the last week it was from 70 to 85 per cent.

The progress of the disease is subject to great variations, especially in children over two years old. The advance of symptoms is slower and is interrupted by periods of remission which may continue two or three days. After being in quite deep stupor, a child may recover consciousness, and even sit up and play with toys, leading to the view that an error in the diagnosis has been made. But this respite is only temporary; soon the child passes again into coma.

From this time the duration of the disease is from three to ten days. The child cannot be roused at all. The pupils are widely dilated, and do not respond to light. There is general muscular relaxation. There may be retention of the urine. Deglutition is difficult, often impossible. The respiration is more rapid, but still irregular. The pulse becomes very rapid and feeble, often 160 to 180 a minute. Toward the end the temperature often rises rapidly to 104° F., sometimes to 106° or 107° F. (Fig. 88). Death usually takes place from exhaustion in deep coma; or convulsions develop and continue from twelve to twenty-four hours until death. Sometimes a patient will live for days in a condition of prostration so extreme that death is hourly expected. A rapidly rising temperature or the occurrence of late convulsions usually indicates approaching death. Of fifty-seven cases, fifty died in coma, seven in convulsions. The entire duration of the disease from the beginning of definite nervous symptoms is rarely over three weeks, and in infants it is usually shorter than this.

Lead encephalopathy gives symptoms in young children very much like those of tuberculous meningitis. There are present, vomiting, head-

Diagnosis.—Tuberculous meningitis is often overlooked because the patients do not give outward evidences of tuberculosis. Its frequency should always lead one to suspect it when protracted nervous symptoms are present in infants. There are no diagnostic symptoms in the early

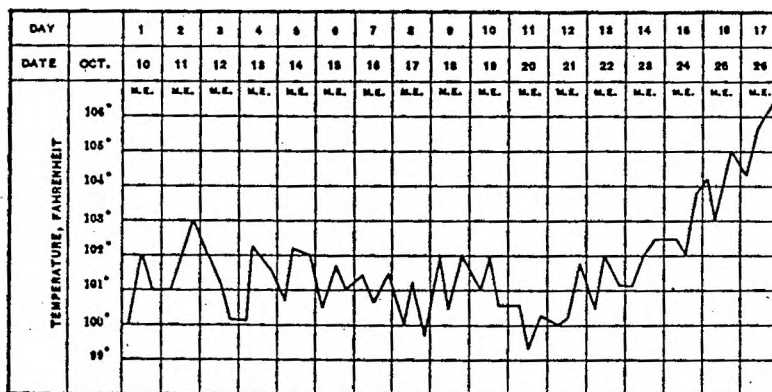


FIG. 88.—FAIRLY TYPICAL TEMPERATURE CURVE IN TUBERCULOUS MENINGITIS.
Boy, twenty months old; death on seventeenth day.

The most diagnostic symptoms of tuberculous meningitis enumerated in the order of their frequency are as follows: persistent drowsiness, obstinate constipation, vomiting without apparent cause, irregular respiration, irregular pulse, convulsions, opisthotonus, and fever which is usually slight. A positive diagnosis is made only by lumbar puncture; by this means this form is distinguished from other forms of acute meningitis. The fluid drawn by lumbar puncture is usually perfectly clear, but sometimes after standing there is a slight deposit present. In rare cases the fluid may be turbid. As compared with the other forms of acute meningitis the cells are few in number. The usual cell count is from 100 to 250 c. mm. Nearly all the cells, over 95 per cent in most cases, are mononuclear. Very exceptionally the polymorphonuclear

The cerebral symptoms are sometimes closely associated with such the diagnosis of meningitis in a young child, since the disease is of a fulminant form, since the organism is a *Staphylococcus meningitidis*. Different